

THE IMPACT OF SPEED ON TRANSMISSION

Why Operations Matter

We can and must strategically control the spread of the virus with changes in operations and behavior so we can keep the economy open and thriving.

Focusing exclusively on what we as government can change, while also continuing to encourage the public to comply with suggested precautions allows for greater accountability and involvement from government and public health organizations to limit the spread of COVID-19. Specifically, two areas of operational changes can have a significant impact: speed and targeted interventions.

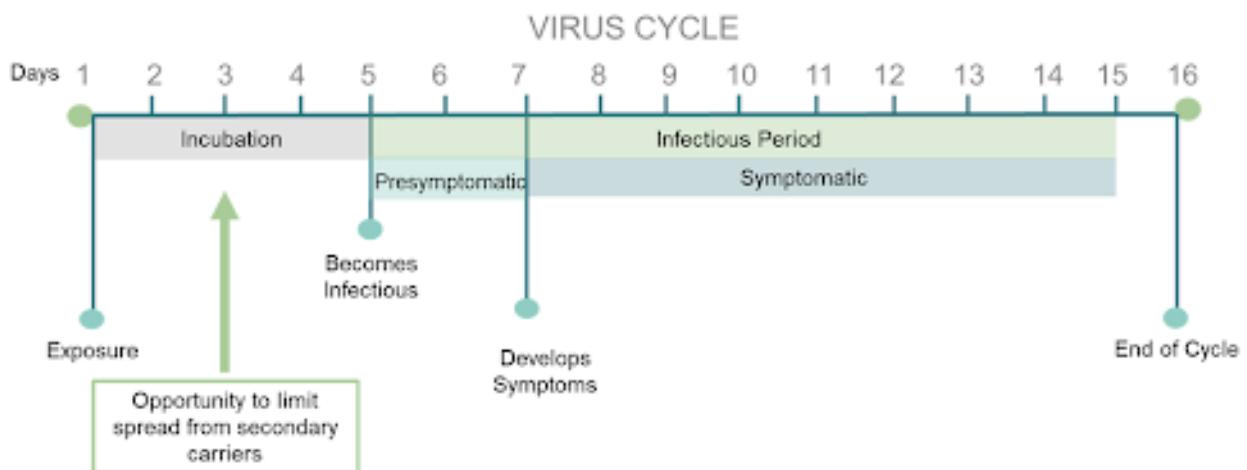
Speed. Robust testing and contact tracing efforts are only as effective as the speed at which these tasks are performed. Due to a short incubation period before an individual becomes infectious, the more quickly an individual is tested and his/her contacts traced, the more likely we are to limit the spread of the virus.

- Currently, the intervention period (testing, results, consequent quarantine recommendation, and contact tracing) takes on average 5.9 days to complete. The period needs to be shortened to three days to reduce secondary spread.

Rapid Response (Super-Spreader Situations). While timely efforts are impactful, targeted intervention in situations where widespread infection is possible (those in occupations with a greater scope of spread) can also help limit additional infections.

- Super-spreaders, while few, make up a significant portion of secondary infections and include occupations like construction, manufacturing, etc.
- Identifying super-spreader environments and speeding up the response can help control these environments' growth rate.

Background



- One person, without any interventions, will infect two more people on average
- Virus carriers become infectious on the 5th day and are infectious until the 15th day
- Carriers may not start showing symptoms until the 7th day and will likely not be tested until that day or after, meaning they may often spread the virus throughout their pre-symptomatic and symptomatic period if not tested in a timely manner
- Once the virus is transmitted to a secondary contact, there is an approximate five-day window for contact intervention prior to the infectious period and subsequent spread

- Given that a person may be spreading two days before showing symptoms, the effective window to respond is three days
- Current intervention takes an average of 5.9 days to complete (3.1 days testing, 1.9 days investigation, 0.9 days contact tracing)



Implications

- The longer it takes to test individuals, process their results, and identify their contacts, the greater the spread will be
- If health departments can contact trace secondary cases before they become infectious, they can limit the spread of secondary transmission
- If an individual were tested immediately upon showing symptoms, test processing and contact tracing would have to happen within 72 hours to maintain the five-day opportunity window for secondary contacts.

Actions and Potential Outcomes

Based on a transmission rate model involving speed and targeted interventions to super-spreaders, GOMB estimates the following:

- Current intervention has decreased the rate of spread where growth is ~130% every 14 days
- With the model above, each day of reduction in cycle time has a significant impact on spread (~40%/day). Conservatively, one day of reduction should reduce spread by at least 20%
- Reducing cycle times by 2.5 days would decrease the rate of spread by ~50% to ~100%, theoretically (though not practically) limiting the spread almost completely, demonstrating the impact speed has on the spread of the virus
- Targeting cycle time reductions solely toward super-spreaders would result in an estimated rate reduction of (~10-20% per day), which alone will have a significant benefit in containing the spread

Proposed Ambitious Targets

Because government cannot control how quickly individuals will get tested or how stringent they will be with self-isolation or quarantine, we must provide reasonable but ambitious targets to make up for what we can't control. The following are proposed:

- Reduce intervention cycle (from testing to quarantining all contacts) to 48 hours for super-spreader situations. This allows for some delays in getting tested and some variation in the period a person is infectious before they get symptoms. This will require triage and speed throughout labs, investigation, contact tracing, and quarantining steps.
- Reduce intervention time to 72 hours (from time of testing to quarantining all contacts) for all other cases, focusing mainly on reducing the time from testing to test results (currently about 3.1 days).
- Respond within 2 hours for a worksite outbreak, and have mobile testing teams onsite within 24 hours for outbreaks at Long Term Care Facilities (and other high risk worksites if necessary).